FLOATING SOLAR PANEL PROVIDED ON EARTHEN DAM

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Abstract - As the water from the dam gets evaporated continuously, the rate of evaporation can be reduced by using floating solar panels. So the amount of water that can be used by the people is increased. The shortage of electricity due to scarcity of non-renewable sources like coal for thermal power plant gets reduced. The main aim of paper is to control the evaporation of water and to generate electricity by using floating solar panel this paper research that Electric Output - 86.12MW/DAY and Water Evaporation Control – 5.5TMC/YEA

***Key Words*:** solar panels, Evaporation of water, electricity generation

1. INTRODUCTION

As the natural resources are degrading day by day there is a need to use solar power for the generation of electricity .So under this project floating solar panel are used as the source for generating electricity. Thus solar power which is a non-renewable source of energy is the future technology which will help us save our environment**.** As the water from the dam gets evaporated continuously, the rate of evaporation can be reduced by using floating solar panels. So the amount of water that can be used by the people is increased. The shortage of electricity due to scarcity of non-renewable sources like coal for thermal power plant gets reduced. The main aim of project is to control the evaporation of water and to generate electricity by using floating solar panel.

2. METHODOLOGY

Jayakwadi is one of the largest earthern dams in Asia. Its height is approx 41.30 m and length of 9,998 m (10 km approx) with total storage capacity 2,909 MCM (million cubic meters) and effective live storage capacity is 2,171 MCM. The total catchment area of dam is 21,750 km^2. There are total 27 water gates for the dam.In the year 2017 it has entered in 43rd year of its life. It has in its lifetime overflowed only 17 times.

Table -1: Specification of Dam

Official name	Jayakwadi-I D02995
Location	Jayakwadi, Maharashtra, India
Coordinates	19°29′8.7″N 75°22′12″E
Construction began	1965
Opening date	1976
Construction cost	4,700cr
Owners	Government of Maharashtra
Dam and spillways	
Type of dam	Earthen dam
Impounds	Godavari River
Height	41.30m (135ft)
Length	9,998m (32,802ft)
Reservoir	
Creates	Nath SagarJalashay
Total capacity	2.909 km^3(1.027×10^{11} cuft)
Catchment area	21,750 km^2(8,398 sqmi)
Surface area	350 km^2 (135 sq mi)
Power Station	
Installed capacity	12MW

Survey (Installation of floating solar panels)

The total surface area of dam is 350km.sq and total catchment area of dam is 21750km.sq. We assume that, out of that total surface area we have to select 60% area (i.e.210km.sq) for installation of solar panels. Remaining 40% area use for fishery and outlet of dam water.

We have selected standard size of solar panel 5x4ft. The output of one solar panel is 250 wattage. Each solar panel is of Rs17500/-.On that selected area of 210km.sq we can provide 3, 44,488 nos. of standard size solar panels. Generally we can control 40-50% of evaporation of water of assumed area.

Evaporation

Quantity of water vapor evaporated from the soil and plants when the ground is at its natural moisture content are known as evaporation.

$$E = \frac{7.4PA(0.447W)^{0.78}}{T + 459.67}$$

Where:

- E = Evaporation Rate (Gallons/Day)
- A = Pool Surface Area (ft^2)
- W = Wind Speed Above Pool (mph)
- P = Water's Vapor Pressure (mmHG) at Ambient Tempe
- T = Temperature (°F)

Analysis for project

Standard size of solar panel = 5x4ft. = 20ft.sq.

Assumed area of installation = 210km.sq = 6889763.77ft.sq

No. of solar panels = 6889763.77/20

= 3,44,488nos.

Cost of one solar panel = 17500/-

Total cost of solar panels = 3,44,488x17,500

= 6,02,85,40,000/- i.e. 600cr approx.

Electricity generation = No. of panels x 250(wattage)

= 3,44,488 x 250

=86.12MW

Result and Discussion

- Electric Output - 86.12MW/DAY
- Water Evaporation Control – 5.5TMC/YEAR
- Thus the advantages include electricity generation, evaporation control and reduction in formation of algae.

3. CONCLUSIONS

1. Reduce evaporation by up to 70%.
2. Cement structures like boilers and chimneys that are used in power plants like thermal have no scope in such a plant. Also electro-mechanical machines like generators are not required which reduce the amount of steel structures in the plant. Therefore, such plants are comparatively more eco-friendly.
3. It can also improve water quality. As water bodies are exposed to the sun, photosynthesis promotes growth of organic matter, including algae. By shading the water, algae growth is reduced, minimizing the associated treatment and labour costs Moreover the concept of more generation due to cooling of the panel surface can be experimented in due course as the investment is nearly 1.2 times the conventional land solar plants
4. A cost effective floating solar power generation system of module capacity is designed and developed, using the materials that are readily available in rural areas. This model can be harnessed at optimum level to boost rural economy.

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